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COURSE AND COURSE CODE: PHYSIOLOGY. PHS 201

ASSIGNMENT ON CARDIOVASCULAR PHYSIOLOGY

1. **Discuss the long term regulation of mean arterial blood pressure**.

The Renin-Angiotensin Aldosterone System.

When blood pressure and ECF volume decreases, the kidneys sense this and renin secretion from the kidneys is increased. Renin converts angiotensin produced from the liver into angiotensin-1. Ang-1 is inactive and is then converted to angiotensin-2 by an enzyme produced from the lungs called the angiotensin-converting enzyme. Ang-2 as a vasoconstrictor aids the constriction of blood vessels, increases the resistance of blood flow and increases blood pressure. It also increases the sympathetic activity of the heart thereby increasing heart rate.

Ang-2 stimulates the release of aldosterone. Aldosterone causes re absorption of water and sodium ions in the kidneys. Anti-diuretic hormone (ADH) is also released under the influence of angi-2. ADH is for ultrafiltration. All these will in turn increase blood volume.

Regulation of Extracellular fluid volume (ECF)

When blood pressure increases, the kidneys excrete large amount of water and salt, particularly sodium, by means of pressure diuresis and pressure natriuresis. Pressure diuresis is the extraction of large quantity of urine because of increased blood pressure. Pressure natriuresis is the excretion of large quantity of sodium in urine.

Because of diuresis and natriuresis, there is a decrease in the ECF volume and blood volume, which in turn brings the arterial blood pressure back to normal level. When blood pressure decreases, the reabsorption of water from renal tubules is increased. This in turn, increases ECF volume, blood volume and cardiac output, resulting in restoration of blood pressure.

2. Write short notes on the following

a. Pulmonary circulation: this is the portion of circulatory system which carries deoxygenated blood to the ventricles, to the lungs, and returns oxygenated blood to the left atrium and the ventricle of the heart.
b. Circle of Willis: the circle of Willis is the joining area of several arteries at the inferior side of the brain. It is a part of the cerebral circulation and is composed of the following arteries; internal carotid artery, posterior cerebral artery and posterior communicating artery
c. Splanchnic circulation: this type of circulation constitutes three parts

i. Mesenteric circulation supplying blood to the gastrointestinal tract.

ii. Splenic circulation supplying blood to the spleen
iii. Hepatic circulation supplying blood to the liver.

d. Coronary circulation: this is the circulation of blood through blood vessels of the heart muscle. It is responsible for the functional blood supply to the heart muscle itself.
e. Cutaneous circulation: this is the circulation of blood between the heart and the skin.

3. Discuss the cardiovascular development that occurs during exercise.

During exercise, efficient delivery of oxygen to the working skeletal and cardiac muscles is vital for the maintenance of ATP production by aerobic mechanisms.

During exercise, the heart starts to pump faster and harder to deliver oxygen to the muscles. This in turn increases the cardiac stroke volume and heart rate raise cardiac output, which coupled with transient increase in systemic vascular resistance, elevate mean arterial blood pressure thereby pumping more blood and supplying more oxygen to all parts of the body.